

This listing of claims will replace the originally filed claims in the application.

Listing of Claims

Claims 1 – 12 (canceled).

Claim 13 (new): A process for producing a krypton/xenon mixture from air, comprising:

- (a) introducing inlet air to at least one air distillation apparatus,
- (b) distilling said air in said air distillation apparatus, thereby producing a stream of liquid oxygen, wherein said liquid oxygen contains most of the krypton and xenon present in said inlet air,
- (c) vaporizing said liquid oxygen stream,
- (d) introducing at least one hydrocarbon stream to said vaporized oxygen stream,
- (e) partially oxidizing said hydrocarbon stream in the presence of at least a portion of said vaporized oxygen,
- (f) producing a syngas containing a maximum of 0.1 ppm mol of oxygen; and
- (g) removing constituents other than said krypton and said xenon from said syngas.

Claim 14 (new): The process according to Claim 13, wherein said partial oxidation is carried out by reacting said oxygen with an excess of said hydrocarbons.

Claim 15 (new): The process according to claim 14, further comprising the presence of steam during said partial oxidation.

Claim 16 (new): The process according to Claim 13, wherein said hydrocarbon stream comprises of one or more of natural gas, methane, naphtha, or coal.

Claim 17 (new): The process according to Claim 13, wherein step (g) further comprises a dessication/decarbonation step followed by a cryogenic separation.

Claim 18 (new): The process according to Claim 17, wherein said cryogenic separation produces one or more of the following:

- a krypton/xenon-enriched stream,
- a methane and carbon monoxide stream,
- a hydrogen stream,
- a carbon monoxide stream, and
- a waste stream.

Claim 19 (new): The process according to Claim 18, wherein said cryogenic separation comprises:

- i. introducing liquid carbon monoxide into the top of a first column,
- ii. expanding the bottom liquid from said first column, thereby creating a first expanded bottom liquid,
- iii. removing the hydrogen from a second column that is fed at the top with said first expanded bottom liquid,
- iv. expanding the bottom liquid from said second column, thereby creating a second expanded bottom liquid,
- v. injecting said second expanded bottom liquid into a low-pressure column fed at the top with liquid carbon monoxide, and
- vi. producing a top stream, comprising carbon monoxide, and a bottom stream comprising said krypton/xenon-enriched stream.

Claim 20 (new): The process according to Claim 19, wherein said cryogenic separation is further comprised of:

- vii. warming said krypton/xenon-enriched stream, and
- viii. separating said krypton and said xenon from the other stream constituents, by means of a second cryogenic separation process.

Claim 21 (new): An apparatus for producing a krypton/xenon mixture from air, comprising:

- an air distillation apparatus that produces a liquid oxygen stream, wherein said liquid oxygen contains most of the krypton and xenon from the inlet air,
- a reboiler, wherein said reboiler is combined with said air distillation apparatus to vaporize said liquid oxygen stream,
- a partial oxidation reactor, wherein said reactor is fed by at least one of said vaporized oxygen stream or a gas that contains at least one hydrocarbon, said reactor producing a syngas containing a maximum of 0.1 ppm mol of oxygen; and
- a means for removing constituents other than krypton and xenon from said syngas.

Claim 22 (new): The apparatus according to Claim 21, wherein said removal means comprises a dessication/decarbonation mean followed by a cryogenic separation unit.

Claim 23 (new): The apparatus according to Claim 22, wherein said cryogenic separation unit comprises a combination of columns suitable for producing a krypton/xenon-enriched stream containing one or more of a methane and carbon monoxide mixture, a hydrogen stream, a carbon monoxide stream or a waste stream.

Claim 24 (new): The apparatus according to Claim 22, wherein said cryogenic separation unit comprises:

- a first column,
- a means for sending liquid carbon monoxide into the top of said first column,
- a means for expanding the bottom liquid from said first column,
- a second column for removing hydrogen, said second column being fed at the top with said expanded bottom liquid,
- a means for expanding the bottom liquid from said second column, and
- a low-pressure column fed at an intermediate level with said expanded bottom liquid from said second column and at the top with liquid carbon monoxide, said low-pressure column producing a top stream comprising

carbon monoxide and a bottom stream comprising said krypton/xenon-enriched stream.

Claim 25 (new): The apparatus according to Claim 24, wherein said cryogenic separation unit further comprises a column for separating said krypton and said xenon from said other constituents of said stream.